CLAIMS

What is claimed is:

1. A sensor for measuring applied forces within an object body, comprising:

a mat having a lower plane and an upper plane repositionable relative to the lower plane in at least one direction responsive to the applied forces from the object body; and

means for measuring the applied forces within the object body by measuring the movement of the upper mat plane relative to the lower mat plane.

2. A sensor according to claim 1, wherein the mat comprises a dielectric body having at least one lower electrode and an upper electrode, the upper electrode being repositionable in at least one direction relative to the lower electrode responsive to the applied forces within the object body.

3. A sensor according to claim 2, wherein the lower electrode is capacitively coupled to an interrogation source, the capacitance between the lower electrode and the interrogation source changing responsive to a change in position between the mat upper electrode and the mat lower electrode.

4. A sensor according to claim 3, wherein the means for measuring the applied forces within the object body comprises means for comparing the sign and magnitude of the capacitance changes between the lower electrode and the interrogation source.

5. A sensor according to claim 1, wherein the mat comprises a dielectric body having a plurality of lower electrodes disposed in a predetermined pattern and an upper electrode, the upper electrode being repositionable in at least one direction relative to the lower electrodes responsive to applied forces within the object body.

6. A sensor according to claim 5, wherein each lower electrode is capacitively coupled to an interrogation source, the capacitance between the lower

electrodes and the interrogation source changing responsive to a change in position between the mat upper electrode and the mat lower electrodes.

7. A sensor according to claim 6, wherein the means for measuring the applied forces within the object body comprises means for comparing the sign and magnitude of the capacitance changes between the lower electrodes and the interrogation source.

8. A sensor according to claim 7, wherein the lower electrodes are disposed in a predetermined pattern such that the capacitance changes between the lower electrodes and the interrogation source are indicative of the magnitude and direction of movement of the mat upper electrode relative to the mat lower electrodes.

9. A sensor according to claim 8, wherein the interrogation source is centrally disposed relative to the mat lower electrodes.

10. A sensor according to claim 8, wherein the lower electrodes are disposed in a predetermined pattern that resolves in three dimensions the applied forces within the object body.

11. A sensor according to claim 10, wherein the sign and magnitude of the applied forces is inferred exclusively from the sign and magnitude of changes in capacitance between the lower electrodes and the interrogation source.

12. A sensor for measuring applied force within an object body, comprising:

a plurality of discrete sensor components patterned into a linear array with each sensor component mechanically isolated from an adjacent sensor, each sensor component comprising a mat having a lower plane and an upper plane repositionable relative to the lower plane in at least one direction responsive to the applied forces within the object body; and

means for measuring the applied force within the object body by measuring the movement of the upper mat plane relative to the lower mat plane.

13. A sensor according to claim 12, wherein the mat comprises a dielectric body having a plurality of lower electrodes disposed in a predetermined pattern and an upper electrode, the upper electrode being repositionable in at least one direction relative to the lower electrodes responsive to applied force within the object body.

14. A sensor according to claim 13, wherein each lower electrode is capacitively coupled to an interrogation source, the capacitance between the lower electrodes and the interrogation source changing responsive to a change in position between the mat upper electrode and the mat lower electrodes.

15. A sensor according to claim 14, wherein the means for measuring the applied force within the object body comprises means for comparing the sign and magnitude of the capacitance changes between the lower electrodes and the interrogation source.

16. A sensor according to claim 15, wherein the lower electrodes are disposed in a predetermined pattern such that the capacitance changes between the lower electrodes and the interrogation source are indicative of the magnitude and direction of movement of the mat upper electrode relative to the mat lower electrodes.

17. A method for measuring applied forces within an object body, comprising the steps:

(a) locating a sensor proximate the body, the sensor comprising a mat having a lower plane and an upper plane repositionable relative to the lower plane in at least one direction responsive to the applied forces within the object body;

(b) connecting means to the mat for measuring the applied forces within the object body by measuring the movement magnitude and direction of the upper mat plane relative to the lower mat plane.

18. A method according to claim 17, wherein the mat is formed at least partially of dielectric material having a plurality of lower electrodes disposed in a predetermined pattern and an upper electrode repositionable in at least one direction

relative to the lower electrodes responsive to applied forces, the method comprising the further steps:

capacitively coupling the lower electrodes to an interrogation source, the capacitance between the lower electrodes and the interrogation source changing responsive to a change in position between the mat upper electrode and the mat lower electrodes; and

comparing the sign and magnitude of the capacitance changes between the lower electrodes and the interrogation source.

19. A method according to claim 18, wherein further comprising the step of placing a plurality of the sensors into a linear array with each sensor mechanically isolated from an adjacent sensor.

20. A method according to claim 19, wherein further comprising the step of placing a plurality of linear arrays of sensors into a two dimensional array with each sensor mechanically isolated from an adjacent sensor.